



ASHESI UNIVERSITY COLLEGE

SCHOOL RECORDS MANAGEMENT SYSTEM FOR BASIC SCHOOLS IN ACCRA, GHANA; USING WESTLANDS LYCEUM, DANSOMAN AS A CASE STUDY

APPLIED PROJECT

B.Sc. Management Information Systems

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ASHESI UNIVERSITY COLLEGE

**School Records Management System for Basic Schools in Accra, Ghana;
Using Westlands Lyceum, Dansoman as a Case Study**

APPLIED PROJECT

Applied Project submitted to the Department of Computer Science, Ashesi
University College in partial fulfilment of the requirements for the award of
Bachelor of Science degree in Management Information Systems

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April 2018

DECLARATION

I hereby declare that this Applied Project is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature:

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Candidate's Name: Nana Adjoa Sika Bentil

Date:

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I hereby declare that preparation and presentation of this Applied Project were supervised in accordance with the guidelines on supervision of Applied Projects laid down by Ashesi University College.

Supervisor's Signature:

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Supervisor's Name: David Ebo Adjepon - Yamoah

Date:

.....

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I would first like to thank God for helping me and giving me self-discipline to pursue, start, go through the motions and complete this project successfully. There is no way I could have completed this on my own.

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Special thanks goes to Friends and Roomies for all the support, the love, the food and the care, and to all the teachers here at Ashesi University for the good quality education I received over the course of these four years.

To my mum, Mrs Cecilia Bentil – for whom this project was undertaken in the first place – I dedicate this work to you as a special way of saying thank you for pushing me to be the best no matter what and being there for me every single day.

To all, again, I say thank you.

ABSTRACT

Basic schools in Ghana, especially in Accra have problems keeping school records for extended periods of time (Azameti & Adjei, 2013). Most of these records are kept in paper form, and since paper is not durable and cannot be kept for a long time, their school records also get lost quickly (Azameti & Adjei, 2013; Adu, 2014). To solve this problem, an electronic web-based school records management system was built for basic schools in Accra, Ghana. The application is to help schools to keep all kinds of school records: Student records, Staff records and Inventory records.

The final application was developed using web technologies like HTML, CSS, JavaScript, and PHP programming languages after the analysis of the questionnaires was completed. The system was developed in three main parts: front-end, back-end and database for each stakeholder module. The main stakeholders of this system were parents, staff, and management of primary schools in Ghana, and for each of them, a different module was created based on the requirements of the stakeholders. The database was created to store all information entered into the system, the back-end handled all the server-side processes that influenced the elements on the front-end pages. The different requirements for the modules were gotten through different questionnaires administered to the different stakeholders.

After implementation, the system was subjected to testing by stakeholders to ensure that it met the specified requirements. Feedback was collected from the participants of the testing phase to serve as the requirements for future work on the application.

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CHAPTER 1: INTRODUCTION

1.1 Background

In recent times, information technology has become essential for everything. Almost every adult and even children have access to all sorts of information at the click of a button due to the proliferation of electronic gadgets like cell phones, tablets, laptops, smart watches, smart TVs and social media. Research shows that about 56% of Americans were active users of social media as of November 2016 and 86% of them are active internet users (Greenwood, Perrin & Duggan, 2016). It is imperative that companies and organizations find easy yet reliable ways of keeping and managing their information. There are diverse kinds of information, and each person has many kinds of information being kept about them at any given point in time. One of such information is school information. Information is kept about the various schools attended, grades obtained, certificates received, and any other information concerning the educational lives of individuals. Statistics show that about 3.48% of the world's population are students (The World Bank Group, 2017), and each of these students, no matter their grade, has all of this information being kept about them by their various schools. Due to this, educational institutions must make it a point to find very effective ways of managing all this information, and the solution that most are turning to is using electronic school records management systems.

1.2 The Problem

Records Management in Ghana is a very big problem. According to Azameti & Adjei (2013), although school records must remain intact for a long time, they do not, especially in Ghana because of poor management. There are two main kinds of records; electronic and paper-based, and currently, Ghana uses the paper-based system more than the electronic one. Both forms

have their merits and demerits, but the disadvantages of the paper-based method of record keeping outweigh the advantages. According to Adu (2014) and Azameti & Adjei (2013), one of the most important limitations of paper-based record keeping is that information is not readily accessible by multiple parties because the papers can only be at one place at a time. Considering this era where information is preferred to be readily accessible wherever and whenever, keeping paper-based records is bound to drag an institution's processes and limit their efficiency. Another reason paper-based records are not the most reliable is that they can be destroyed easily by water or fire, and if there were no extra copies saved somewhere secure, all the information would be gone. This is very risky because the extra copies could also be destroyed in one way or another and the institution would have nothing to work with. Paper-based records are also quite cumbersome to keep because they take up a lot of space and use a lot of paper and toner. It also takes special effort to ensure that they are kept properly all the time but even with that, paper being made from natural elements is bound to rot, hence, it is not reliable.

Records management is very important because records form the basis on which some important decisions are made and policies developed and implemented (Seniwoliba, Mahama, & Abilla, 2017). Thus, without proper means of keeping, securing, and accessing records, institutions will not be able to function properly. This has caused developers to come up with safer, more secure, and more reliable ways of keeping and accessing information, i.e. electronic records management systems. Now, a lot of institutions abroad and even here in Ghana have adopted this way of keeping and managing their information, and slowly, more people are getting to know about it and migrating from the paper-based system. This project aims to help solve the problem of poor records management in primary schools in Accra, Ghana, especially the government managed ones.

1.3 Motivation/Reasons for pursuing this project

Considering that today, information is a very vital part of all the work we do and even our private and social lives, it is important that we find the best way to keep and manage it and make sure that it is used in the best ways possible. It is for this reason that institutions have to adopt electronic records management systems that have all the best features and security to help them keep information. Currently, Ghana is doing quite a poor job managing information, although some of its institutions have migrated to the electronic based records system. The majority of the government institutions, especially hospitals still depend on the paper-based system (Adjorlolo & Ellingsen, 2013; Azameti & Adjei, 2013). This reduces the productivity of the country as a whole as a lot of time and effort is spent in locating and re-shelving files and making sure they do not rot, get lost or destroyed. The educational sector, especially the primary and secondary sections are very heavily reliant on paper records to do their daily duties. As a result, this project seeks to build a system so that primary schools in Ghana, especially in the Greater Accra Region can transition successfully from paper-based records to electronic records. This way, the educational sector and therefore the country can move one step closer to overall development.

1.4 Related work

Ever since the introduction of and wide-spread use of information technology in our everyday lives, schools and software developers have introduced several kinds of school management systems to help schools better manage their information and processes. In this section, I will be talking about some of the school management systems currently available and what they do.

1.4.1 SAFSMS

SAFSMS is a school management system built by FlexiSAF, a Nigerian tech company. It is a complete school management system built with features for parents, staff, school administrators and students. Each user has specific modules built for them depending on what kind of information they are allowed to see. Some of the features for parents are comments from school administration about child, a communication platform for parents to interact with their children's teachers, result tracking for easy access to their children's grades and school fees payments for easy access to the state of their children's school fees and other bills. Features for administrators include finance management – to manage the finances and accounts; academic overview – for a general view of academic work in the school; inventory management - for checking inventory; promotion management - for checking promotion status of staff and clinic management - for managing health information. Features for students include academic progress report, student finance management and transcript issuing. Features for teachers include payroll management, curriculum and lesson plan management, results compilation and time table and schedules (FlexiSAF, 2017).

1.4.2 Fedena

Fedena is an all-in-one college and school management software. It is available in multiple languages and like SAFSMS, it provides user-friendly dashboards and login access for teachers, management, and students. Fedena has modules to manage timetables, grades and reports, online examinations, online payment portals, student attendance, courses, classes and batches, admissions and event calendar. It also has a module for parent-teacher collaboration and SMS integration for easy communications among users (Foradian Technologies, 2017).

1.4.3 WEB school

WEB school is a web-based school management system. Its features include a finance portal for parents, a notice board for quick messaging, student admission module, lesson planning module for teachers, leave management module to track leaves and absences, time table, exams management, accounting and fees module to track finance from administrator's point of view, academic calendar and student or employee register (Gescis Technologies, n.d.).

1.4.4 Advanta Innovations

Advanta innovation is a student health management system that helps keep track of student health data. It was designed as a module as part of the Advanta ERP school management system but it can stand alone. It also automatically generates reports based on information entered (Advanta Innovations, 2017).

1.5 Objectives

To achieve the aim of this project, a set of objectives are provided:

1. Identify more effective and new ways of managing school records information
2. Develop my skills in computer programming and learn more about effective ways of coding.
3. Build a functional web application for basic schools, using Westlands Lyceum as a case study.

1.6 Methodology

To be able to achieve these goals, I will have to do the following:

1. See the management of Westlands Lyceum and other basic schools in Accra, Ghana,

and get the requirements of the product specified by conducting interviews and handing out questionnaires to the stakeholders of the project: staff, management and parents.

2. Conduct extensive literature review to see what kinds of school records management systems there are already and identify any possible gaps or improvements that can be made.
3. Use basic computer programming skills and languages to provide a functional web application that suits all kinds of basic schools in Accra, Ghana.

CHAPTER 2: REQUIREMENTS

2.1 User Groups

This project identifies three main stakeholders for the records management system: staff of primary schools, management of primary schools and parents of primary school students. These stakeholders will each have different roles and uses for this records management system and these will be defined subsequently.

2.1.1 Staff

Staff of primary schools are primarily responsible for the teaching and learning process that happens in schools. They teach students, quiz them, grade their papers, observe and help them through their physical, educational, behavioural and emotional growth. Managing students, however, is not easily done and so there will be some features specifically tailored to help staff manage students and their academics properly. Staff will be the secondary administrators of the system: they will have access to only the vital information they need to help students – academic information and health information. They will be able to view information concerning all students and even themselves, but not other staff members.

2.1.2 Management

The management of primary schools in Ghana keep all sorts of information about their students: date of enrolment, parent information, student information, and even staff information. They also manage student financials and academics and will need to have features specifically made for them so they can manage all of this information and access it readily whenever and wherever. Management will serve as the administrators of the software and will have absolute access to all parts of the system.

2.1.3 Parents

Parents of primary school students, especially those in upper primary and Junior High School like to keep track of their children's academic progress as well as their physical, emotional and behavioural progress in school. Thus, the features for parents will include modules for managing all of these fundamental aspects of the parents' monitoring of their children. Parents will be the 'end users' of the system: they will only be able to have access to information concerning their wards. Parents will not be able to view information of other children who happen to be family members unless they are the guardian on record for those children.

2.2 Requirements Gathering.

For this project, the main method of gathering requirements was through the administering of questionnaires. Westlands Lyceum, a primary school in Dansoman, Accra is serving as the case study and the main stakeholder of this project. Questionnaires were handed out to a sample of parents, management and staff of Westlands Lyceum, as well as parents, administrators and teachers of several other schools in Accra to identify their particular needs in a records management system. Despite getting some requirements from stakeholders in Accra, some requirements were taken from related work so that the end system would meet industry standards as well.

2.2.1 Requirements Gotten from Related Work

From research on related work, some general requirements were identified for the three stakeholders:

Parents: Parents will need modules for tracking the academic progress and grades, health and financial information of their children.

Staff: Staff will need modules for managing students' academic information, and viewing and updating student health information. Also, in the staff aspect, there will be a functionality for staff members to add and edit their personal information as well as the subjects and classes they teach.

Management: Given that management is going to be the super user of the system, there will be many different modules for managers. Management will have a module for checking and managing student information – financial, health, academic - checking and managing staff information and managing inventory information.

2.2.2 Requirements Gotten from Questionnaires.

Three different questionnaires were made: one for parents, one for teachers and one for administrators. These questionnaires were handed out randomly to ready participants from various schools in Accra. In all, there were 42 questionnaires handed out: 15 to teachers, 22 to parents, and 4 to administrators. Of these 42, only 39 questionnaires were returned. The requirements analysis was done based on these 39 responses. A copy of each of the questionnaires can be found in the Appendix.

Administrators

In the administrators' questionnaire, they were asked mostly qualitative questions. The questions were to find out whether they had a problem keeping records, how they kept them if at all, whether they would like a new software for keeping and managing their records and what they would like to do with such a system.

From the responses given, it was clear that keeping accounting, inventory and admission records was very important to administrators. It was also seen that a lot of administrators kept

their records in paper form and they were not very satisfied with this mode of keeping records. All four respondents said they would like to have a new software to keep and manage their records.

The requirements gathered for the administrator module of this project are that administrators would like a system that gives them the ability to keep accounting, inventory, student personal and admissions records.

Teachers

Of the 15 questionnaires handed out to teachers, only 13 were returned. All the respondents stated that they kept records, and the most popular type of records kept was grades, followed by student personal information and class attendance. 84.6% of the respondents (11 out of 13) stated that they kept their records in paper form and the same percentage of respondents said they would like to have a special software for keeping and managing their records.

From the responses given, the requirements for the teachers' module are that the system should be able to allow teachers to store grades or academic records of students, attendance records and also personal information. It was also gathered that they would like to be able to share relevant information about their students with their guardians via phone. Very few respondents also mentioned that they would like to have a central website where they could access and update their students' information easily.

Parents

22 out of 25 parents responded to the questionnaires and returned them. All 22 parents answered yes to the question "Do you receive any records from your ward's school?". Of all the different kinds of records received by parents, it was seen that grades were the one that each one of the

respondents received. Only 12 received teachers' remarks and very few received the other kinds. 95.4% of the parents mentioned that they got their records in paper form and 81.8% stated they would like a new method of accessing records about their children. Each respondent was asked to state what kinds of records they would like to receive about their children and the topmost types of records that received the most votes were academic performance or grades and behavioural reports. When asked the form they would like their records to come in, 11 out of 22 respondents stated that they would like it via email, with a close second - 9 respondents – preferring to receive them via any other electronic means: website, spreadsheet form, or via cell phone.

From these responses, it is clear that the system to be developed must allow parents to have easy access to their children's grades and behavioural information, and these records must be easy to access by the parents themselves, and not their children. It was also mentioned that the records must be timely and must be updated regularly to provide parents of the real-time progress of their children in school.

2.3 Functional Requirements

Functional requirements can be defined as a statement of things that the system or program should be able to do by the end of its development. They mostly define the various functions and functionality the system should have and how it should work (Sagitec Solutions, 2011). The functional requirements for this project were specified according to the stakeholders and the various modules.

2.3.1 Parents

According to the information that parents should be able to view, the functional requirements are as follows:

- The system shall allow parents to see their children's academic information
- Parents should be able to view financial information pertaining to their children
- Parents should be able to view the health information of their children.

2.3.2 Staff

- The system shall allow staff easy access to view and edit student health information
- The system must be able to let staff view and update student academic information
- The system must be able to allow staff to edit their personal information
- The system shall allow staff to view but not edit student personal information.

2.3.3 Management / Administrators

- The system shall allow managers to manage information concerning staff
- The system must allow management to view and update student financial, health and personal information, and be able to view but not edit student academic information.
- The system shall allow management to manage inventory information

2.4 Non-functional requirements

Non-functional requirements are statements that define the attributes a system has or should have. They do not state the main requirements of the system; they are mainly focused on

auxiliary characteristics of the system. They help ensure the efficiency and usability of the system by users (Scaled Agile Inc., 2017).

The non-functional requirements for this system are as follows:

- Usability: The system should be easy to use by all users and stakeholders, including those relatively new to technology. All links and sections should be clear and easy to find. All labels must also be clear and font size and type should be legible.
- Reliability: The system should work wherever and whenever it is needed for use.
- Correctness: The functions, buttons and links in the system should work exactly the way they are labelled and were programmed to work.
- Appearance: The system should be designed beautifully to make it attractive to all end users.
- Privacy and security: The personal information entered into the system should be kept private and must only be accessible to authorized users.
- Scalability: The system should be able to work well with varying amounts of data and not crash in pressure periods.
- Usefulness: The system must be useful to the user; it must respond directly to their needs.
- Performance: The system must function properly and must work fast.
- Cost-effective: The system should be cost-effective to maintain; the benefits of using the system must outweigh the costs incurred in its development.
- Flexibility: The system should be able to work in different situations; it should be adaptable for different uses and must be able to work on different operating systems.

2.5 Modules

The system has three main modules: one for parents, one for teachers and one for the administrator. The parents' module comprises features that enable parents check their children's personal, financial, academic and health information. The information in financial information section will be inputted by the administrator, who makes it visible to parents. The medical and academic information will be inputted by teachers and parents will be able to view but not edit it. If there is any new information, parents will have to see the administrator so the update can be made. The parents' module relies heavily on the staff or teacher's module and the administrator's module for information. If no information is entered from those modules, there will be no information to see. Parents are also able to see but not make changes to their children's personal information.

The teachers' module is broken down into three parts: student health data, student academic data and staff profile. The student academic data module interfaces with all the other modules: the administrator is able to view the data entered there, and so are the parents. Teachers are the main source of information for this module. The student health data aspect interacts with the other modules: the administrator can view and edit student health information, but parents can only view this information. For the staff profiles section, only the administrator module interrelates with the staff module. Parents are not able to view staff profiles in any way, but the administrator and staff member whose profile it is can see and make changes to the profile. Staff members are allowed to view their colleagues' profiles.

The administrator's module has three sub-divisions: staff information, inventory information, and student information. Staff information contains information about the classes and subjects a staff member is teaching, and staff members' profiles. Inventory information contains

information about materials in inventory including their numbers and records of withdrawals and by whom. Student information is grouped under four headings: academic, personal or bio data, medical, and financial. Under academic, there is a section for grades, where the administrator can see the grades of the students for their various subjects, their classes – what subjects they are studying that term, and their teachers – which teachers are teaching them which subjects. The staff module inputs the information for the academic information aspect of student information. Student personal information is only editable by the administrator. Staff members are allowed to view students' personal information. Student medical information is open to all – staff, parents and the administrator, but as already said, only staff and administrators have the right to change any information in this section. Finally, with student financial information, staff are not able to see this information whatsoever. Only parents are allowed to see this information, but even parents will not have the rights to edit this information. The administrator has the sole right to edit this information. Should any concerns arise, parents are to see the administrator for corrections to be made and issues resolved. Only the parent and administrator modules are connected in this aspect of the administrator module.

2.6 Use cases.

For the purposes of this use case scenario, the stakeholders of this system – parents, teachers and management of primary schools in Ghana – will be described as actors.

The school administrator is in charge of the general management of the school, so their use cases for the system involve managing inventory, viewing and updating staff information and viewing and updating student information. The school's administration comprises anyone who oversees activities in the school - the proprietress, the headteacher, and the heads of the various

schools (pre-school, lower primary, upper primary and junior high).

Staff is made up of teachers, who will be the main people inputting the data into the system.

Teachers are the second most important users of the system because they are the ones who stay with the students all year and know their academic, emotional and behavioral patterns best. In case of a health issue, the teacher is bound to be the most knowledgeable source of information because they take care of the students. For this reason, their use of the system should enable them to view and update student information (academic and health), manage student performance (academic and health) and view and update their own personal information.

Parents are the final stakeholders involved in this project. Parents would like to view their children's progress in school in whatever field – academic and health. Parents would also like to view the status of their children financially and know what arrears they have to settle. Due to this, the system will include modules for parents that will enable them to view but not update their children's financial status, academic and personal information.

In this project, 'parents' is a broad term used to describe anyone in charge of taking care of the students at home. It could include grand-parents, aunties, uncles, cousins, nannies, guardians and the like. It is known that some parents and guardians have very little knowledge of how to use computers or the web so this will be taken into consideration and the system will be built such that students can access it for their parents or guardians to see.

The use case diagrams for the system is shown in Figure 2.1 and a detailed diagram for each actor can be found in Appendices B, C and D.

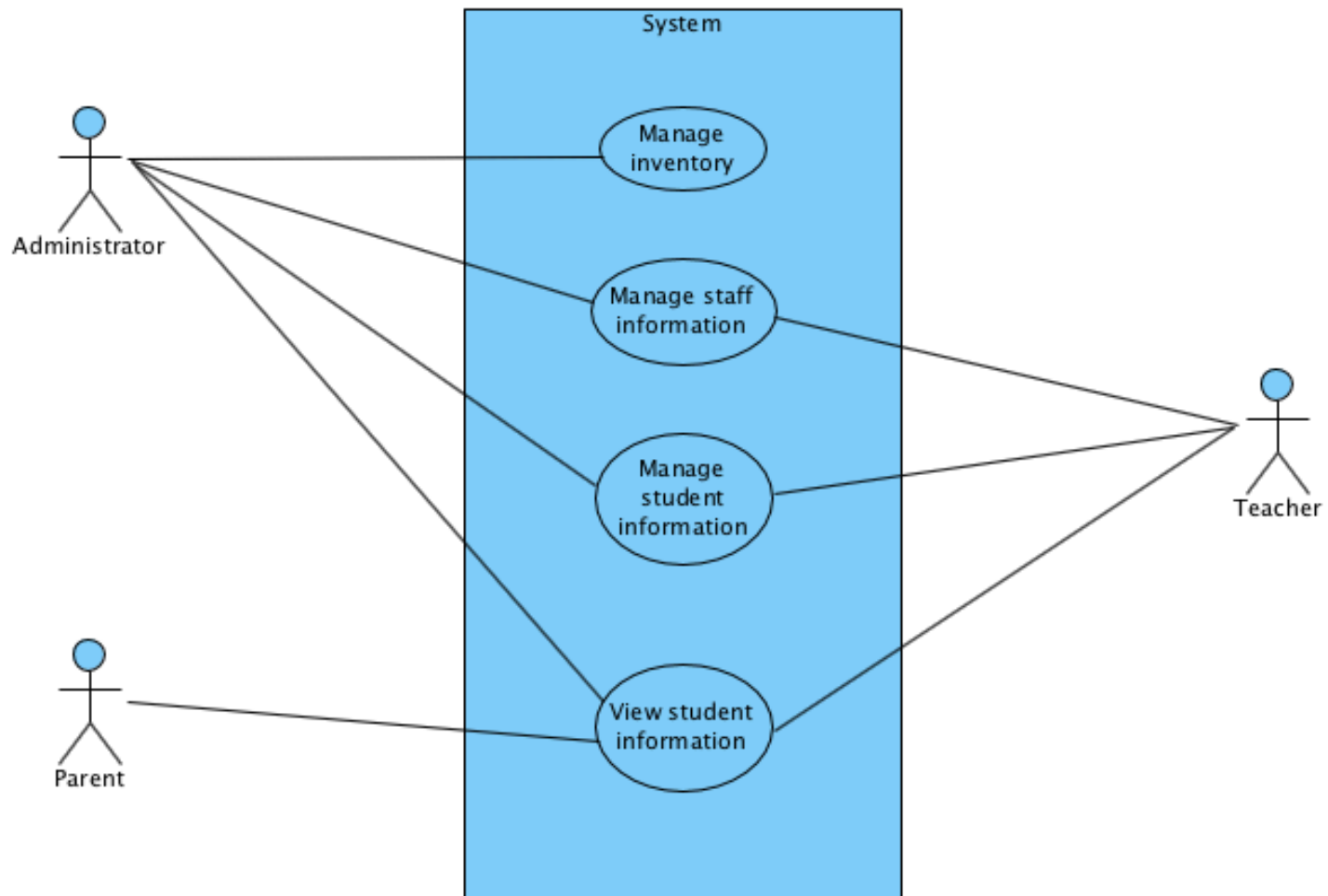


Figure 2.1: Use Case Diagram of the System

CHAPTER 3: HIGH LEVEL ARCHITECTURE

3.1 Introduction

This section talks about the various aspects of the system, describing the devices it can be accessed from, the people who can use the system, the architectural pattern used in building the system and the database design.

3.2 System Architecture

The system has a three-tier web architecture: client or front-end, back-end or server and database. The front-end or client side will be built with front end programming languages like HTML and CSS and JavaScript. The Front-end side will be what the users will see when they open the web application. The Back-end side of the system will be built with server-side programming languages like PHP and Python. The back-end or server side is what will be running the various processes and sending and receiving requests to and from the server. The Database will be a MySQL database and will be built using phpMyAdmin.

The system is built mainly as a web application that can be accessed by any authorized users of the system on laptops and desktops. It can be accessed at any time, and only users who have the required login credentials can enter into the system and do whatever they wish to do.

Currently, the system has not been hosted live as a website, but is using XAMPP as its server, thus, any users of the system must have XAMPP installed and running on their machines. It is likely that in the future, this system will be published and be accessible to all users via the internet and a web browser.

3.3 Structure of the system

The system will be built in the form of a website, with links that lead to the web application aspect. When a user goes to the homepage, they will see several tabs or buttons with information about the school. They will also see a tab that says “parents”, and that tab is the link through which parents can access their login page and get into the system. When a parent is able to log in successfully, they will see a dashboard with links to view their children’s financial, health and other school information. These links will lead them to pages that display the information they are looking for.

Another link on the main website will be called “login”. This link will only be used by administrators and staff(teachers). It leads the user to a login page where access is only granted if the credentials entered are staff or administrator credentials. After login, the user will be taken to the appropriate dashboard: staff to the staff dashboard and administrator to the administrator dashboard.

From there, they can see the various links to the various pages they have control over and they can perform all sorts of tasks on the information they have: add, edit, delete, search. The structure of the system is represented in Appendix A.

3.4 User Identification

Each user has a unique ID, username and password: The IDs are generated by the auto-increment function of the phpMyAdmin database and the usernames and passwords are created by the users themselves. These IDs and passwords help authenticate and authorize the user’s entry into the system, making sure that no malicious persons are trying to enter the system. For parents, when registering, they enter their children’s ID numbers and these help in controlling

the information they see on successful login into the system. These IDs are linked to individual records, so once a parent logs in, the only information they see on their dashboards is all of the relevant information about their children. Staff and administrators' IDs play different roles, however. Staff IDs let the system know exactly which staff member is logging in and helps the system to know which information to display. Staff have privileges to view all student information so their IDs only regulate which staff profile will be displayed, and not which student's information can be viewed. Administrator IDs are there to let the system know that an administrator is logging in, and so all of the information in the system should be made readily available for access when the relevant buttons are clicked.

3.5 Architectural Pattern.

This project utilizes the Model-View-Controller(MVC) architectural pattern in its development. The Model-View-Controller pattern, henceforth known as MVC, is a popular architectural pattern used in software engineering that divides applications into three different but connected parts: The Model, the View and the Controller.

The model is the data management part of the application: it comprises all the back-end sections of the application that the user indirectly interacts with. It includes the database and the main logic behind the entire system.

The view is the user interface aspect of the application. It transforms the elements from the model into user friendly mode, so end-users can use the application comfortably.

The controller is the section in charge of controlling the objects in the model and making sure they work when they are needed and that they work the way they are supposed to.

The MVC approach was chosen because it is the most popular and most suitable approach for building web applications in recent times. Another reason the MVC approach was chosen over others is that its segregation of the system into these three parts makes it easy to update the system backend without affecting the user interface. It also makes it easier to work on and develop the system because it divides the system into smaller components that can be handled one at a time, making them independent of each other.

3.6 Database Architecture

Due to the nature of this project and the fact that it is a records management system, a database is very essential. The database is the central part of this project because without a database, it will be impossible for this system to work as intended because it will not be able to keep and retrieve information when needed. It is for this reason that a database is built into the core of this system.

The database system that was chosen for this system was the MySQL-based phpMyAdmin database. This choice was very easy to make because MySQL is a very popular and quite simple database management language to learn and to use. Another reason phpMyAdmin was used is that the bulk of this project was coded in PHP, and so phpMyAdmin being a database that interfaces well with PHP was an added incentive to choose it as the database at the centre of this project.

The database for this project is made up of many tables, about ten (10) in total, each table specially designed to handle specific pieces of information the system collects. For instance, being a school records management system, the system is bound to house some personal information concerning students in the school so there is a table named 'student' that keeps all

such information. There is also another table named 'staff', which keeps all the staff(teachers) personal information, ID numbers, and contact information.

Each table has a primary key column that helps to uniquely identify each row (tuple) in the table. This primary key column is named ID and is the basis for the login IDs. Each student has a special ID that is used to draw up all their information if need be. Parents have access to this ID and it helps them log into the system and see only their children's information.

Almost all the tables in the database interact with each other because they are mostly centred around the students. Due to this, the linking factor between tables is the student ID. The Student ID is used as foreign keys in other tables firstly to prevent redundancy, and secondly, to help make the database efficient.

The database was built following the rules of normalization. In response to the first normal form rule of normalization, the database was built such that no two rows in any table contain the same amount of data, i.e. there is no repetition anywhere. Also, the tables were built such that only one value is stored in one cell and each tuple has a primary key to uniquely identify it. With respect to the second and third normal form rules of normalization, all columns that were partially dependent on the primary key were separated and made into a new table and that there is no transitive functional dependency in any of the tables. The structure of the database is shown in Appendix D.

CHAPTER 4: IMPLEMENTATION

4.1 Structure of Implementation

The implementation of this project was done in three modules or subsections, one for each stakeholder – administrators or managers, teachers, and parents of primary schools. In each module, the implementation was further broken down according to the requirements gotten from the questionnaires and related work. These modules were developed using functions to make the elements independent of one another. All the functions that control the various elements in the modules can be found in one document that is called by all the pages in that module and in some cases, outside the module. These ‘function pages’ were called ‘process____’ with the name of the module filling in the blank space. Below is a detailed account of how each module was implemented.

4.2 Implementation of Administrator Module

From the requirements gotten, it was seen that the main requirements for the system by the administrators (according to their questionnaire responses) were the ability to keep student information, bills or accounts information and student academic or grades information. Other requirements of the system were that the system provide the means for prospective students to send in their applications online, for staff records to be easily recorded and accessed, student attendance to be easily kept and recorded and also for it to be easy to interact with parents of the school children.

In implementing the administrators’ module, these requirements were taken into consideration and used as a basis for the functionality in the module. However, there were some additional requirements from the main stakeholders i.e. Westlands Lyceum, and these were also added to

the administrator module requirements. There were also some requirements from related work that were taken into consideration. In general, all the requirements gathered for the administrator module were:

- Keeping staff members' personal, classes and subjects information.
- Keeping students' personal, financial (fees), academic (grades) and health information.
- Keeping track of school supplies (inventory).

All these requirements as stated above have been implemented in the administrator module. All the various aspects of the administrator module have a focal point of access: the administrator dashboard. The administrator dashboard can also only be accessed after login to help aid in securing the information.

4.2.1 Using the Administrator Module.

The administrator accesses his login page from a central page that has links to all of the login pages for each of the stakeholders. On clicking that link, they are redirected to their login page, on which they would have to enter their login credentials. After their login details have been verified, they are redirected to a dashboard, from where they can access the various features of the system. They are then allowed to browse the system, clicking links and buttons as they see fit and using the system as they like and are allowed to. Below are some screenshots of the various interfaces of the administrator module.

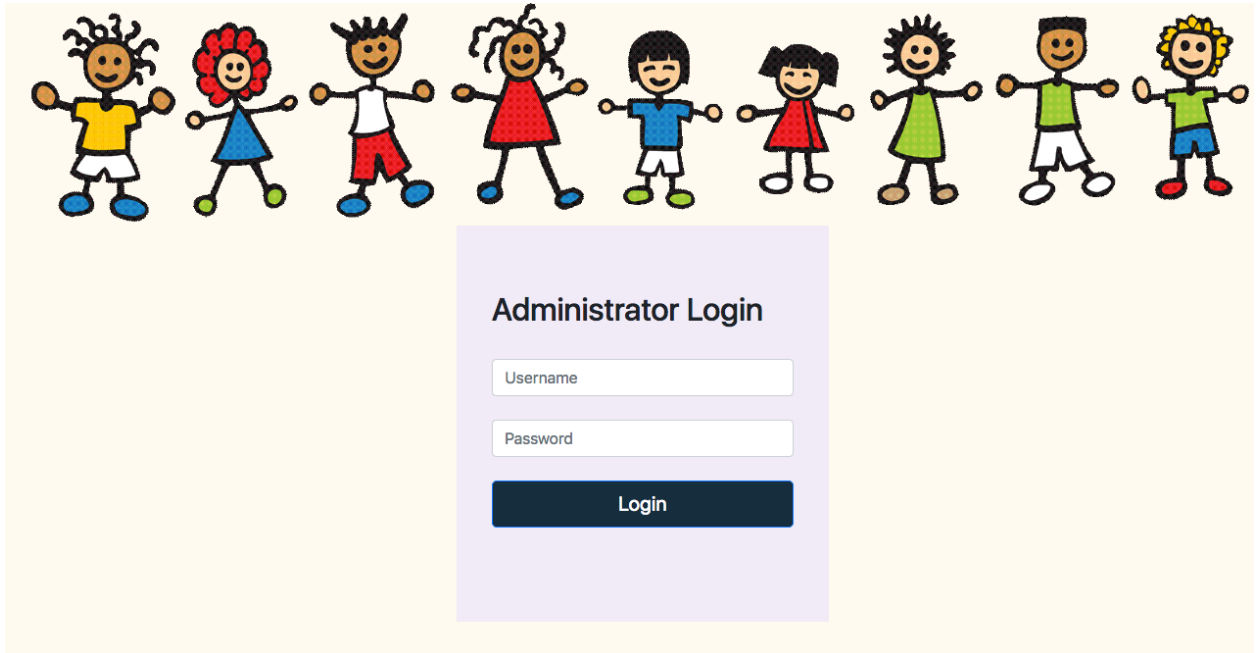


Figure 4.1: Administrator Login Page

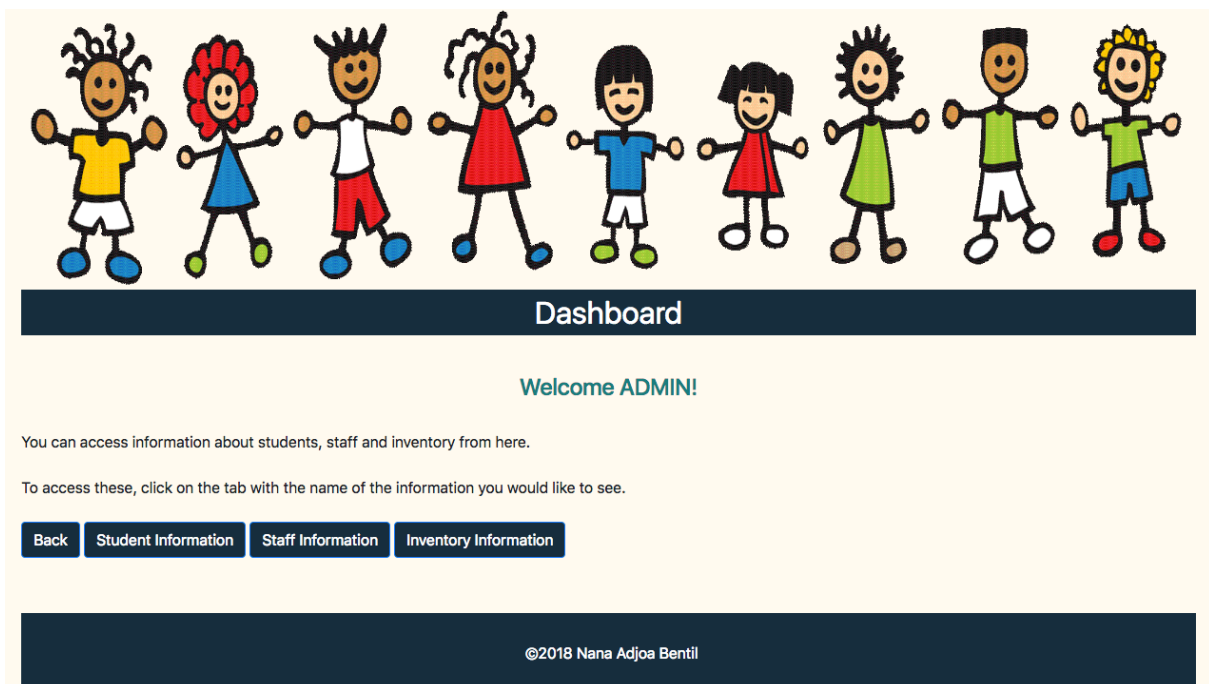


Figure 4.2: Administrator dashboard

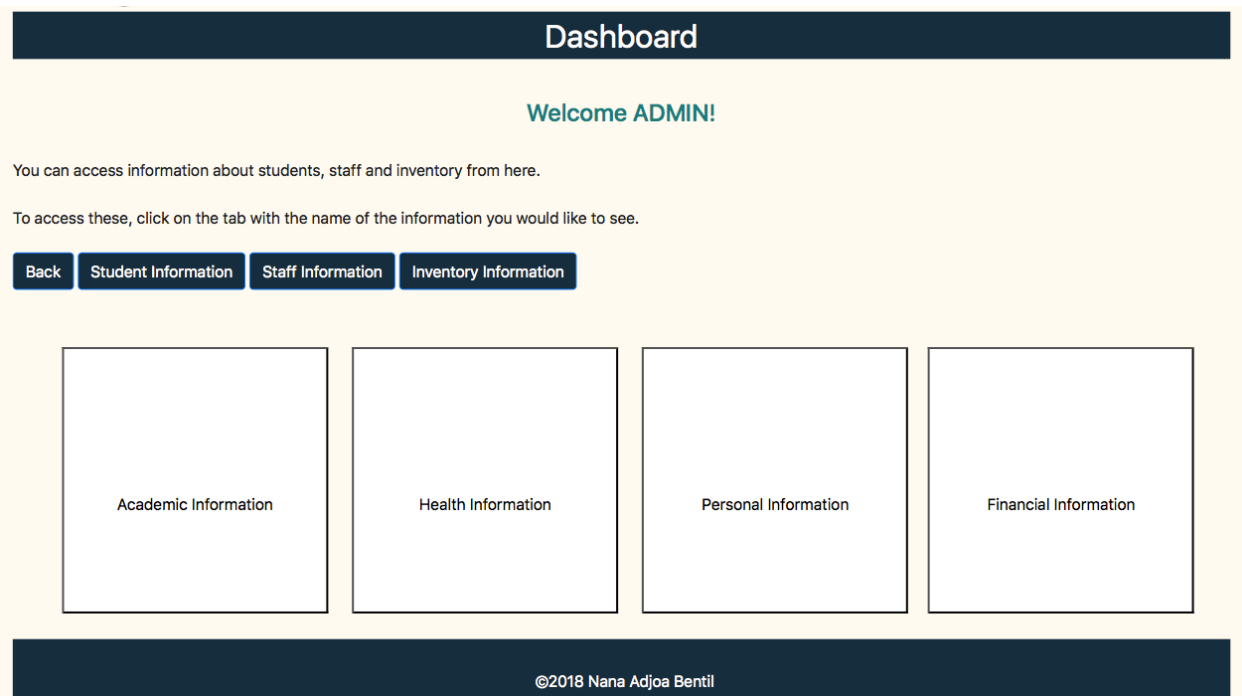
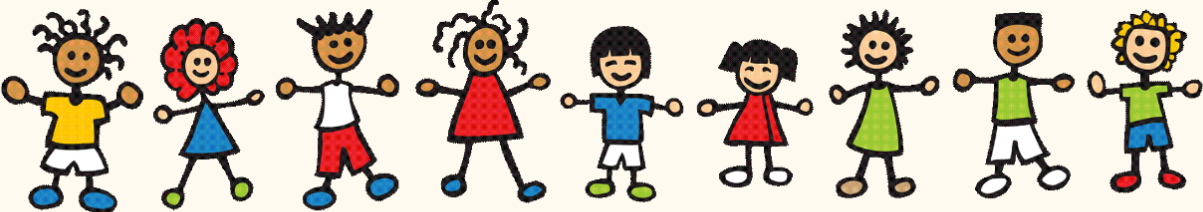



Figure 4.3: Administrator page after clicking 'Student Information' button



Student Academic Information								
Back	Search	Delete						
Record ID	Student ID	Subject Name	Teacher's Name	Score	Grade	Class	Term	Year
4	9301	french	Julia	65	c+	2	Jan-April	2018
5	9301	French	Julia	60	C	5C	Jan-April	2018
6	8898	English	robert arryn	90	A	JHS 1	May-August	2014
7	2448	English	Julia	80	A	JHS 1	May-August	2017
8	2448	Pre-tech	robert arryn	65	c+	2 lilac	Sept-Dec	2014
9	2448	Visual Arts	Janey Simpson	78	B+	4 pastel	Sept-Dec	2013
10	9301	Mathematics	robert arryn	73	B	KG 2	May-August	2000

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Figure 4.4: After clicking 'Academic Information' button



View Inventory Items						
Search by type:						
<input type="text"/>						
<input type="button" value="Search"/> <input type="button" value="View Totals"/> <input type="button" value="Back"/>						
ID	Item Name	Item Type	Grouping	Number In Stock	Total	Date and Time Recorded
1	markers	stationery		25	25	0000-00-00 00:00:00
2	Paracetamol	Medicines		4	4	0000-00-00 00:00:00
3	Note 3 books	stationery		30	30	0000-00-00 00:00:00
4	Mop	Cleaning Supplies		10	10	0000-00-00 00:00:00
5	Rice bag	Food		8	8	0000-00-00 00:00:00
6	Gentian Violet	medicines		2	2	0000-00-00 00:00:00
7	Cleaning brush	cleaning supplies		8	8	0000-00-00 00:00:00
8	colour pencils	stationery		12	12	2018-01-24 15:27:01
9	sharpener	stationery	singles	3	3	2018-03-21 21:24:18

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Figure 4.5: Administrator viewing all inventory items

4.3 Implementation of Teachers' Module

After analyzing the questionnaires and coding the responses, it was seen that the main requirements of the system according to the teachers were that the system should provide the means for teachers to share the information they input about students with the student's parents - 31% of the respondents said they wanted this functionality. 15% of the respondents – the second highest percentage of responses – wanted to be able to access and manage their information via a central website where they could all login and go about their activities.

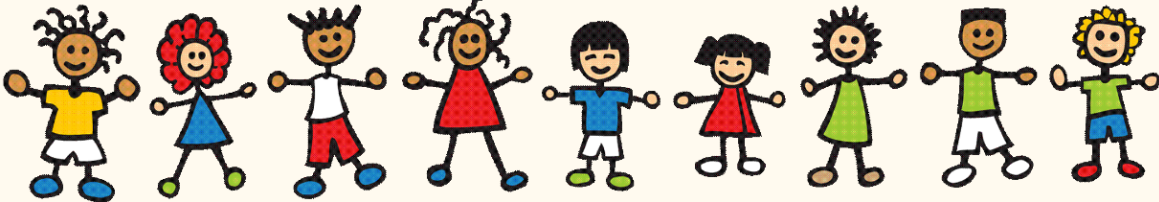
Looking at the requirements, it was noted that a lot of the requirements provided by the teachers were not actually functional requirements, and so could not influence the building of the system directly. Due to this, the requirements from related work were fallen upon heavily to provide functionality for the teachers' module. The requirements used in developing the teachers' module are as follows:

- View and add student health information.
- All access to student academic information: view, add, search
- All access to their (staff) personal profiles: view, update
- View only access to student personal information
- Add and view subjects and classes information

For some of the functionality, especially the ones concerning the students, due to security and accountability, the teachers have been prevented from effecting some changes on the data presented and have been given view only access. Teachers have been given access to see and edit student health information because in Westlands Lyceum, it is the case that there is no health worker present, so the teachers serve as the first point of call in case of any medical issues. For staff profiles, teachers have the ability to view all staff members' profiles.

4.3.1 Using the Teachers' Module

Just like the administrator, teachers access their login page from a central page that has links to all of the login pages for each of the stakeholders. Before teachers can use the system however, they are added by the administrator, who gives them a username and a default login password. They are sent an email after they have been registered to confirm their registration and to show them their username. In the email also, it is stated that they have to change their password before login. After changing their password, they can now login into the system and see their dashboard, from where they can access the various functionality provided for them. Some screenshots of the teachers' module can be found below. A sample email alert can be seen in Appendix L.



Staff Profile Information

[Back](#)

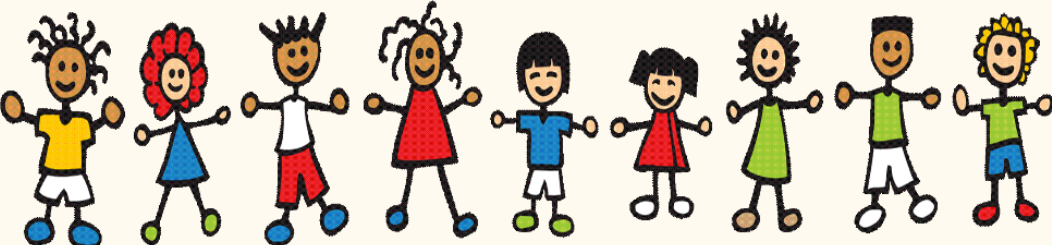
Search for staff by ID

[Search](#)

Staff ID: 98
 Full Name: Janey Simpson
 Username: janey
 Telephone Number: 244332211
 Email address: janeysimpson@westlandslyceum.com
 Next of Kin: James Simpson
 Next of Kin's Telephone Number:

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Figure 4.6: Teacher searching for staff members' profiles



Staff Subjects and Classes Information

[Back](#) [Add](#) [Search](#) [Delete](#)

Staff ID	Subject	Class
1	french	2 oak
98	geometric construction	6
41	physical education	8
41	writing	5
1	twi	8
41	English	JHS 2 OAK
41	Pre-technical skills	2 lilac
98	ghanaian language	JHS 2

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Figure 4.7: Viewing all staff subjects and classes information

4.4 Implementation of Parents' Module

Parents are the third part of the stakeholders of the system and as already mentioned, they were given a separate questionnaire from the other stakeholders. From their responses to the questionnaires, the requirements for the parent module are as follows: 82% of parents wanted to be able to see their children's grades / academic performance, 50%: behaviour, 18%: bills and fees (financial information), 9%: health information, and 5%: attendance and biodata. From these and related work on similar modules for parents, the final requirements arrived at for parents are:

- Viewing student financial information
- Viewing student health information
- Viewing student academic information
- Viewing student personal information

The rest of the requirements specified by the respondents were not used in the development of the system because after consulting the management and parents of Westlands Lyceum, it was seen that the most important functionalities are the four mentioned above.

Parents are only able to view information for security reasons. In the case they would like to change something, they would have to consult the administration of their children's schools.

4.4.1 Using the parents' module.

Like the other stakeholders, parents have to access their login page from a central page that has links to all of the login pages for each of the stakeholders. On clicking that link, they are redirected to their login page. If the parent has not registered into the system, they can click on the link that takes them to the registration page, where they will enter a username, a password

and their child's student ID number. Parents get their children's student ID numbers through email after their children have been registered into the school (a sample email alert can be seen in Appendix K). After registering, they are redirected to the login page. Upon successful verification of their credentials, they are redirected to a dashboard, from where they can access the various functionality provided for them. Four buttons have been provided on the page, each one linking to a different type of information about a child or student that a parent is able to view. On click of a button, the relevant information as described by the button is displayed in a drop down format, and the parent is able to view that information. Due to the nature of the system, the parent is only able to view the information for the child with whose ID they registered into the system. Parents are also sent emails when information about their children - especially academic and health information – are updated. A sample email alert is found in Appendix K. Below are some screenshots of the parents' module.

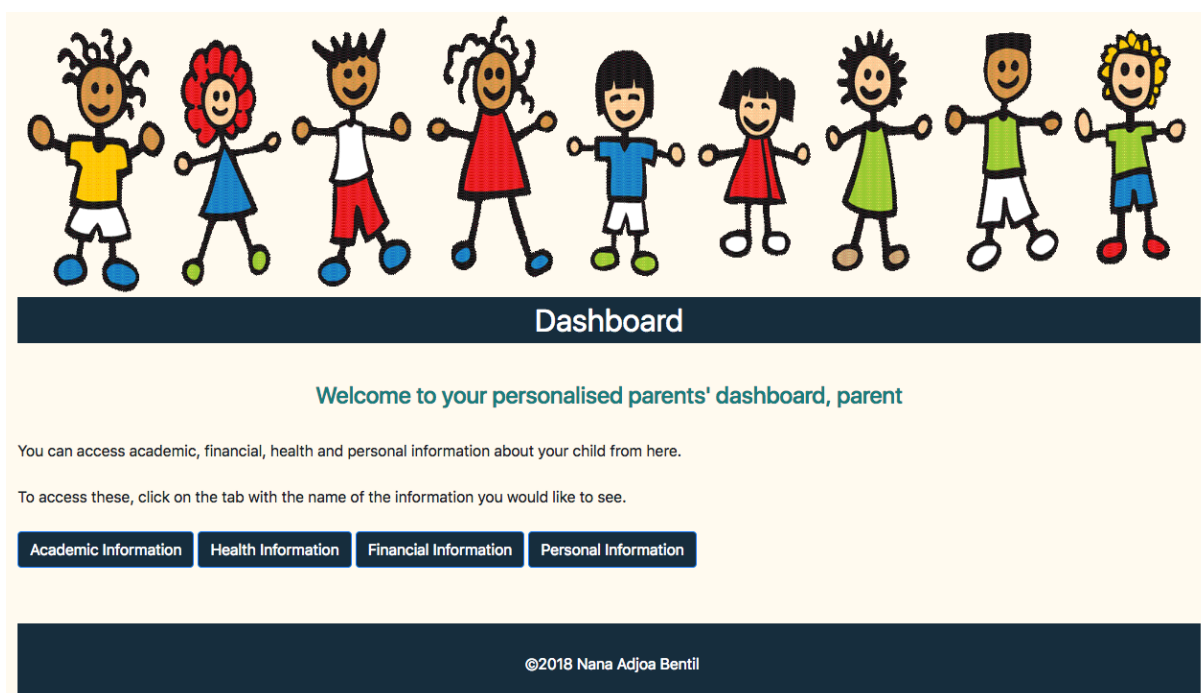


Figure 4.8: Parents' Dashboard

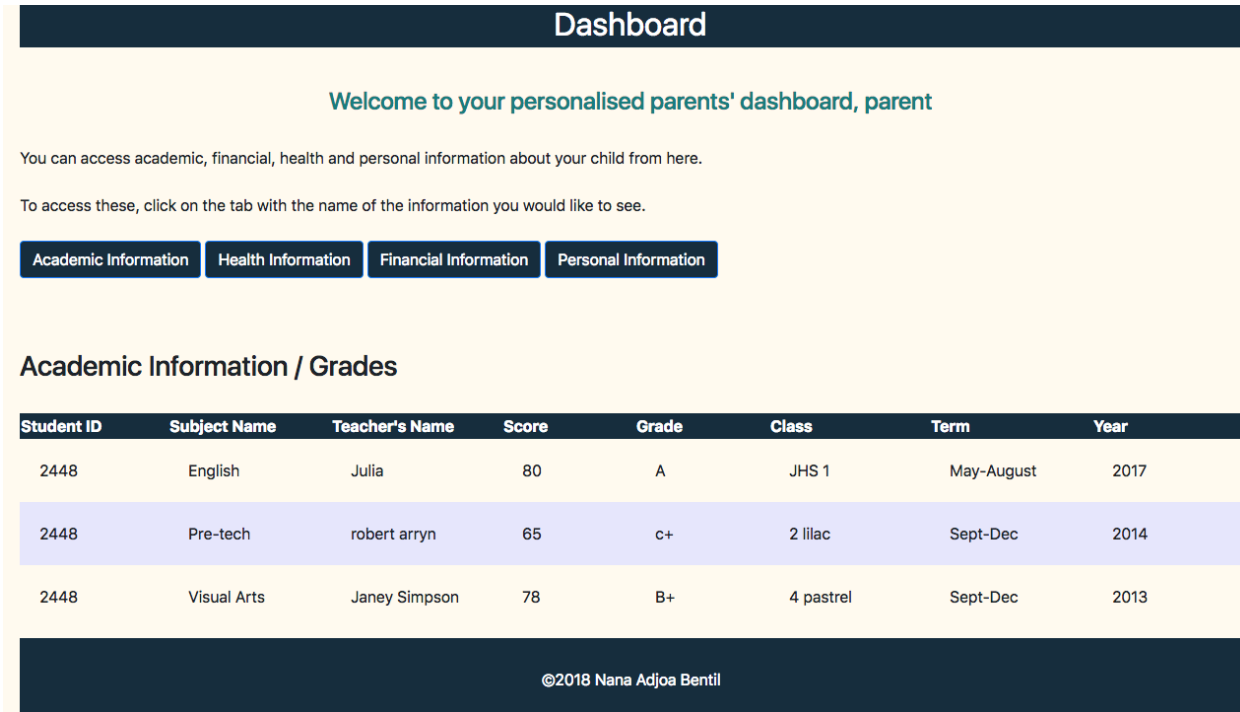


Figure 4.9: Parent viewing child's academic information

4.5 Technologies, Tools and Programming Languages.

The application was developed in three main parts: the front-end section (or user interface), the database, and the back-end section, also known as the server side. Different programming languages were used for the various sections due to their differences in operation. In the upcoming sections, these are explained in further detail.

4.5.1 User Interface (Front-End)

Being a web application, the graphical user interface was built with HTML and CSS programming languages. The Bootstrap CSS and JavaScript framework was also used in the structuring of the forms, which made up about 75% of the total functionality of the application.

Below is a detailed description of these programming languages and the reasons they were chosen above the others.

4.5.1.1 HTML

HTML stands for HyperText Markup Language and is a very popular programming language used in software development for web applications (w3schools, 2018; Shannon, 2012). The main reason that HTML was used for this project is that it is the standard programming language for building websites and web applications, and this project is in the form of a web application (Shannon, 2012). The version that was used in this project was HTML 5.

4.5.1.2 CSS

CSS stands for Cascading Style Sheets. It is a programming language used for styling webpages, especially HTML webpages (Shannon, 2012). For this project, the version of CSS that was used is CSS 3. The CSS programming language was used in designing and styling the webpages created and structuring the layout of the pages. CSS was used mostly externally: the webpages were styled in a separate file from the HTML files and then those CSS files were called in the ‘<head>’ tag of the HTML document using the ‘<link>’ tag.

4.5.1.3 Bootstrap CSS and JavaScript

Bootstrap is an “open source toolkit” that helps in developing webpages or web applications (Bootstrap, 2018). It provides ‘processed’ CSS files that help design various components of a HTML webpage. The JavaScript files that come with Bootstrap are used to help in the responsiveness of the components and the webpages.

Bootstrap was chosen over some other CSS and JavaScript frameworks like Materialize, Semantic UI and Foundation by ZURB for the following reasons:

- Bootstrap is the most popular and the most widely used Front-End Framework and has a lot of support material on the Web as compared to the others (Gerchev, 2018).
- The learning curve for Bootstrap is not as steep as compared to that of Semantic UI, and the Bootstrap form design is better as compared to Materialize (Edwards, 2018).
- Bootstrap is consistent across all browser versions, meaning that it is assured that the webpage design stays the same across (Edwards, 2018).
- Bootstrap is easy to integrate into PHP – which is the language being used for back – end development, while Semantic UI requires extensive knowledge of JavaScript (Edwards, 2018).

Figure 4.10 shows the login form for teachers designed with Bootstrap CSS and JavaScript.

4.5.2 Database

For the purposes of this project, a relational database was chosen to serve the database needs of the application. The reason a relational database was the best choice for this project is that from the requirements, it was seen that a lot of the information that the schools kept was easily classifiable into tables and columns. Since that is the way that relational databases represent their data, it was decided that those would be used instead of non-relational databases.

The relational database of choice for this project was phpMyAdmin, which will be further described and explained in the upcoming subsection of the same name.



Figure 4.10: Login Form Designed with HTML and Bootstrap CSS

4.5.2.1 phpMyAdmin

phpMyAdmin is an open source database software tool which was written with the PHP programming language and helps in using MySQL databases online. It supports databases written with MySQL programming language as well as with MariaDB (phpMyAdmin contributors, 2018).

phpMyAdmin structures its databases in the form of relational databases: it represents data in the form of tables and rows.

phpMyAdmin was chosen for this project because:

- It was written with PHP and can be easily integrated into PHP code (phpMyAdmin contributors, 2018), which is being used as the language for the server side script.
- It is free and very easy to use, especially for a small scale system like this one.

- Considering that this project needs a relational database, phpMyAdmin was the best choice for all the reasons stated above as well as the fact that it is a relational database so it is well suited for this task.

4.5.3 Server side (Back – end)

The back-end of the system was written in PHP and MySQL. These are explained further in the subsequent subsections.

4.5.3.1 PHP

PHP is short for Hypertext Preprocessor. It is used for server-side scripting, and PHP scripts are executed on servers (The PHP Group, 2018). For this project, the server currently being used is XAMPP, which is a combination of Apache Web Server, PHP and MySQL. PHP is chosen as the back-end script for this project because:

- It works well with HTML and returns results to browsers in plain HTML format, which is very beneficial to this project since it is a web application (W3Schools, 2018).
- It is “the best language for web programming” (The PHP Group, 2018).
- As compared to Perl, which is another scripting language, PHP is simple and very easy to learn and to use (The PHP Group, 2018).
- Another reason PHP was chosen is that it is very popular, and so support and help material is very easy to find online. According to Shiotsu (2017), PHP is used by 82.9% of websites, meaning it is quite reliable.

4.5.3.2 MySQL

MySQL is one of the many versions of the very popular database programming language, Structured Query Language, SQL (Oracle, 2018). It is known for querying databases, especially relational databases (w3Schools, 2018). The reasons MySQL was chosen as the programming language for the database are as follows:

- It is free and open source, and works very well with relational databases, which this system uses (Mack, 2014).
- It is integrated into PHP, and so it is very easy to use with PHP and phpMyAdmin (w3Schools, 2018).
- It is easy to learn and to use, and is not complex, making it easy for first-time users to quickly grasp the concepts (Mack, 2014).
- Help and support material is easy to find online because it is the most popular programming language for querying databases (Mack, 2014).

CHAPTER 5: TESTING

5.1 Introduction

In developing this application, users were asked to fill questionnaires to provide the requirements for development. After the application has been built, there is a need for the system to be tried by the users or potential stakeholders to assess its usefulness and whether it solves the problems mentioned in the requirements analysis stage.

The main purpose of this chapter is for testing the application to see whether it fulfils the requirements the users provided for the system in the early stages of development. The system was built mainly using the requirements from the case study: Westlands Lyceum, a school in Dansoman. In testing the system, it was done in 2 parts:

- Development Testing
- Acceptance / User testing

5.2 Development Testing

Development testing here refers to all the different tests that were ran on the system during implementation and development. It includes unit testing, component testing and system testing.

5.2.1 Unit testing

In unit testing, the various functions of the system were tested as they were being implemented to ensure that they worked individually before being combined with many other functions. The fact that the system was developed with each element calling a separate function made it easy to know which parts of the system were not working, and consequently made it easy for the developer to debug. After unit testing was complete, all debugging had been done and it was

certain that all the functions were working as they should, all these working functions were now put together in a single file for each module, which now controls all elements and pages of that module.

5.2.2 Component testing

Component testing in this application took the form of checking whether all the aspects of the three-tier architecture of the system were working well. For example, in fulfilling component testing requirements, it was important to check the front-end design to see whether the elements were appearing and interacting with each other as they had been designed. It involved checking the design to see if something had shifted or text was reappearing when it was not supposed to. It also involved checking whether the information pulled from or inserted into the database was going under the right headings. Another part of component testing for this system was checking whether the back-end files were linked properly and working with the elements on the front-end and interacting with the database as they were made to. Component testing produced excellent results, and so the testing was scaled up, and the next stage was system testing.

5.2.3 System testing

For this application, system testing involved checking the entire system and seeing whether it matched up to the functional and non-functional requirements that were mentioned in Chapter 2. After checking the system against the non-functional requirements, the system works well in the fields of usability, reliability, correctness, appearance, performance and flexibility. This means that currently, the links and buttons in the system work just as well as they were made to, they link to the right pages, they are easy to understand and locate, and the system performs

well. On the points “privacy” and “security”, more can be done to secure the system to make it harder for unauthorized users to break in and this will be considered in future work. Also, because the system has not been hosted live on a server and has not been tested extensively by stakeholders, the system cannot be said to be cost-effective. However, it can be said to be useful based on the responses from stakeholders from Westlands Lyceum after they tested it as part of the acceptance or user testing process.

5.3 Acceptance / User Testing

The acceptance testing process was done to fulfill the most important reason for developing the system: meeting and satisfying the need for which it was developed. The need that was to be satisfied, in this case, was the poor and unsustainable way of keeping records in primary schools in Accra, Ghana, and this test was to ensure that the three stakeholders or main users of the system – who were introduced in Chapter 2 – are happy with the system that has been built.

Due to time and hardware constraints, the system was only tested by potential users from Westlands Lyceum, which is the case study for this project.

5.3.1 Testing the Administrators’ Module

The Process

Two administrators from Westlands Lyceum tested the project. In testing the project, they were given a laptop with the system installed on it and made to navigate the system at will. As they used the system, they were free to ask any questions they had about the system. They did not ask many questions, but for both respondents, the main thing they asked for was an overview

of how the system worked. The system was tested using the Google Chrome browser because that was what the respondents were familiar with.

Results

After navigating and testing the application, there was some feedback from the respondents about the functionality of the system. First, they expressed how much they liked the simplicity of the design and how easy the application was to use. However, they also gave some constructive criticism on the system. One respondent commented on the administrator's ability to remove information from the database and gave the suggestion that the administrator not be able to delete anything, but rather to add an updated version of the same information. This, he said, would prevent malicious activity from going on in the system and ensure accountability, especially in the cases where the administrator is not the owner of the school. The other respondent also commented on the search functionality. Currently, the search functionality works by IDs, and respondent 2 drew attention to the fact that administrators may not know all the IDs of all the people so there should be a way to search by name. The administrators also asked about how information will be accessible anytime and anywhere, and it was explained that the application would be hosted online so that all could access and work on information easily.

5.3.2 Testing the Teachers' Module

The Process

For the teachers' module, two teachers from Westlands Lyceum were asked to and given the opportunity to test the system. Again, like the administrators, the test was done using the Google

Chrome browser because that was what the teachers preferred. The teachers were given the current login credentials for the system and after successful login, were left to test the system and use it to the best of their abilities.

Results

The teachers were very pleased with their module of the application, and also expressed some concerns about the manipulation of records by ID. The reason they gave for this was very similar to that of the administrator: in the case where the records become very numerous, it will be hard to use the system if everything is accessible only by ID number.

5.3.3 Testing the Parents' Module

The Process

Two parents were selected out of a pool of respondents to test the application to see whether it met the requirements given. These parents were made to test their module using a laptop with the system installed on it and left to use the system. Due to the nature of the system and the fact that a parent would have to be registered into the system in order to successfully login and access the dashboard, a dummy profile was created for a student and a parent to get a login username and password. After logging in, parents were guided through the system by the developer who explained each button and each element as they were being used.

Results

Parents were very happy that they could access academic, health, financial and personal information about their children in such a convenient manner. However, the question came up

about parents with multiple children. Currently, parents can only see the information of one child and it was a source of concern for the parents because a lot of them have more than one child. This concern was taken into consideration and would serve as a requirement for future work on the system.

All these concerns from stakeholders were noted down and would be used as a source of requirements for the evolution stage of the project.

CHAPTER 6: CONCLUSION

6.1 Introduction

In this chapter, the conclusion for the project, the challenges faced while completing this project, the limitations the system has and the future work that will be done on the system will be expressed into detail.

6.2 Challenges Encountered during Development

In the implementation of this project, there were a lot of challenges encountered. Of all of these challenges, the main ones were selecting a suitable framework for the front-end to make the forms look presentable as well as present the data in a nice and user friendly manner. Another challenge was that the system was not able to be hosted on a server so the testing of the system was not robust enough. This prevented the developer from knowing how well the system performed online as compared to how it performed on laptops.

6.3 Limitations of the System

From the feedback received from the participants of the testing process, the following limitations of the project were derived:

- The use of IDs in manipulating information in the system is not good enough for a system that will most likely have more than 100 entries in the database.
- The parents not being able to view the academic information of multiple children where needed would pose a problem in the future where parents have two or more children enrolled in the same school.

- The application not being hosted on a server and only being run on laptops does not allow for live updates on each user's system.

As mentioned earlier in Chapter 5, these limitations will be taken into consideration and used to make decisions on the evolution of the system.

6.4 Evolution of the System / Future Work

After careful analysis of the feedback from the testing stage, it has been decided that for future work, the following will be implemented in the system:

- A search functionality that enables users to search by name and any other relevant field
- A functionality where parents can select which of their multiple children's results or information they would like to see at a particular point in time.
- The application will be hosted online.

6.5 Conclusion

After all the research carried out on this project and after implementation, it can be seen that there is a strong need for applications to help schools especially in Accra, Ghana to manage their records electronically. These applications can take any form: web-based, mobile, and any other electronic form.

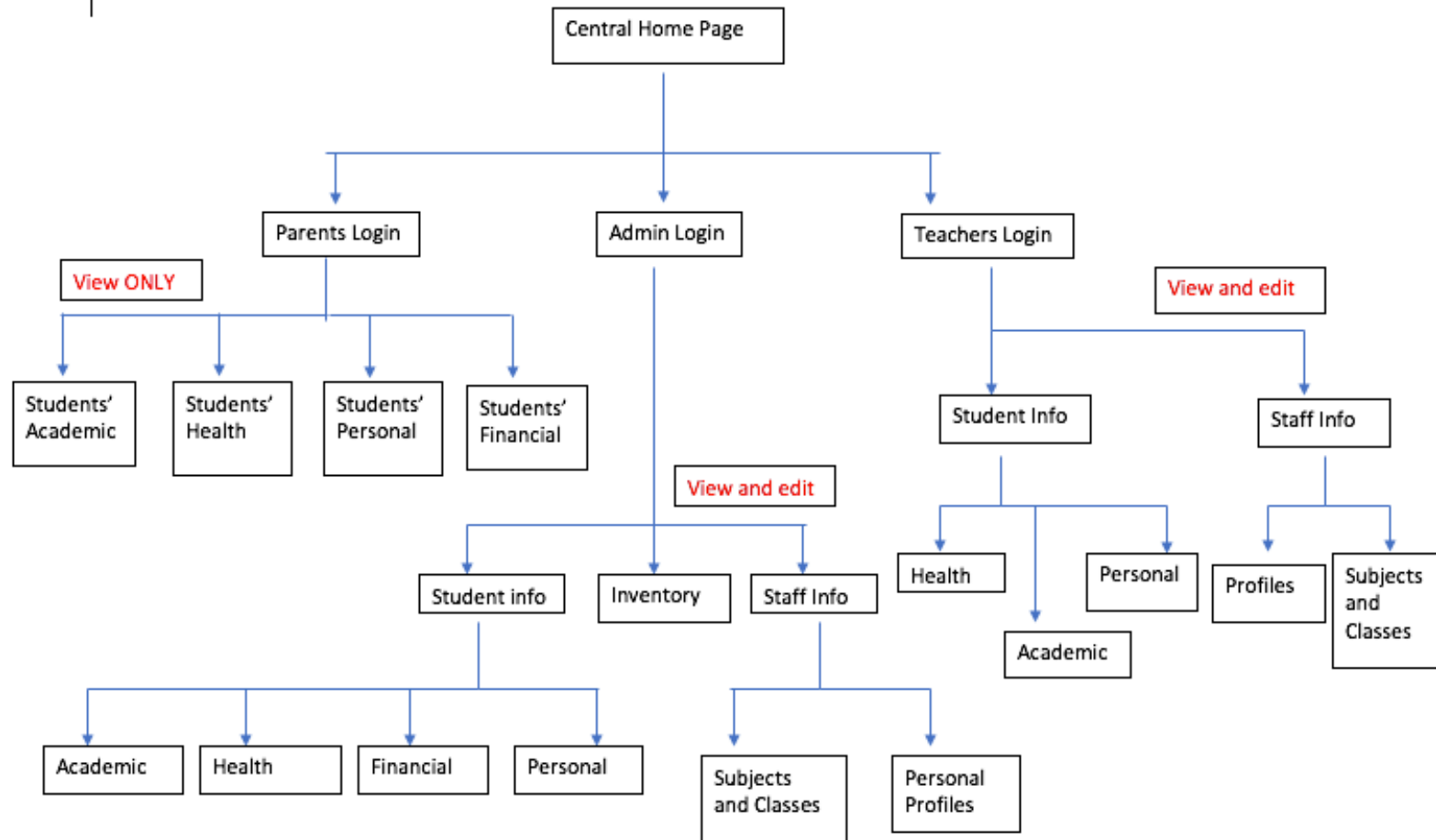
Some of the strengths of this application are its simple yet nice and easy to use interface that lets even a novice grasp how to use the system easily. Another strength of this application is its ability to combine three different stakeholders' modules together in one and let them interact seamlessly with each other.

Despite the successes, there are some things that the system could have done better. Some of these things are allowing users to search and update by names and not just IDs, allow parents to see records of all their children at once, and sending emails or text notifications to parents on information update.

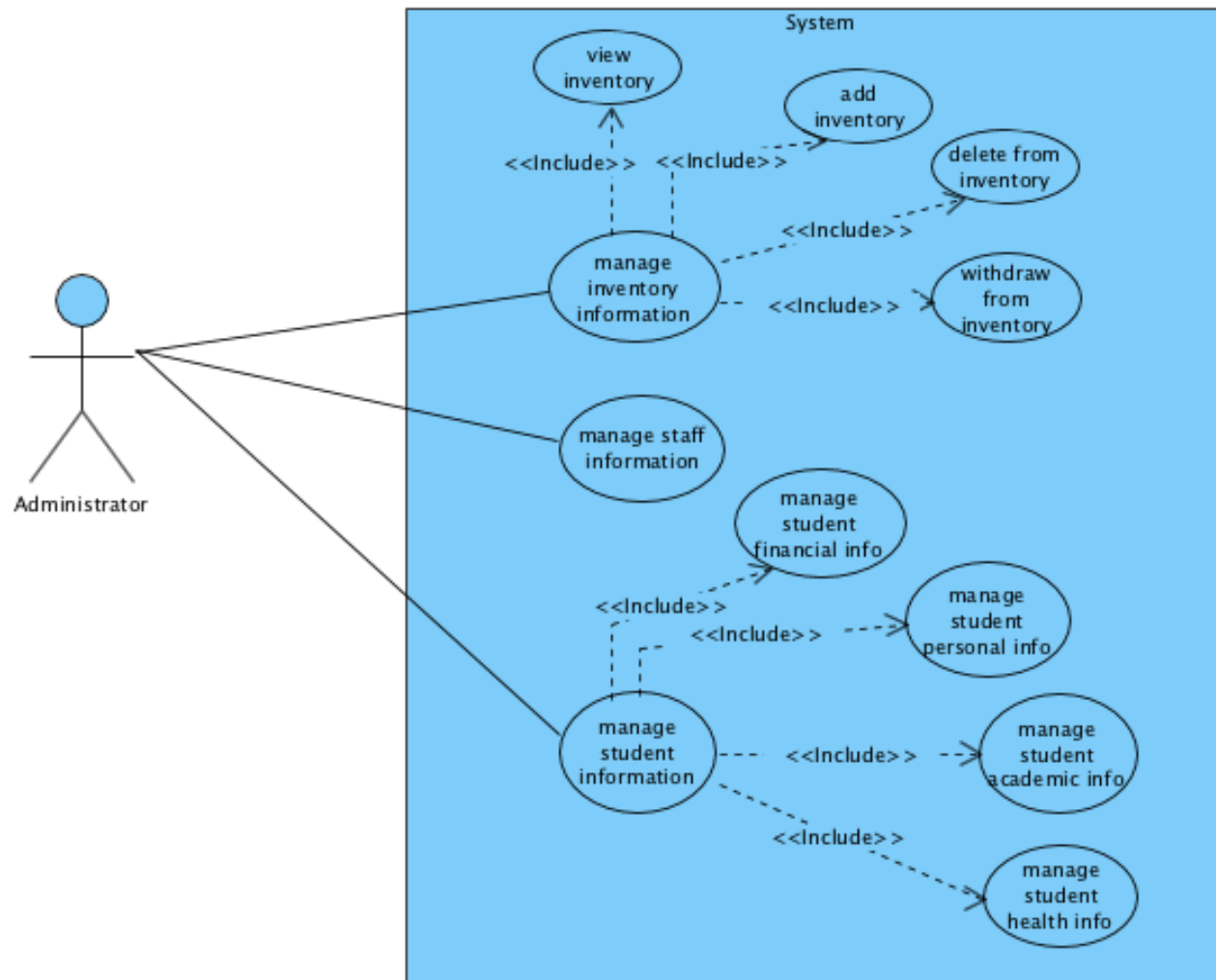
In conclusion, it can be seen from everything that an application that helps schools to manage their information easily and interact with parents is a necessity in Ghanaian basic schools, especially in Accra, Ghana. It is also clear that this is a new subject under investigation, so it is a ready sector for development and advancement.

APPENDICES

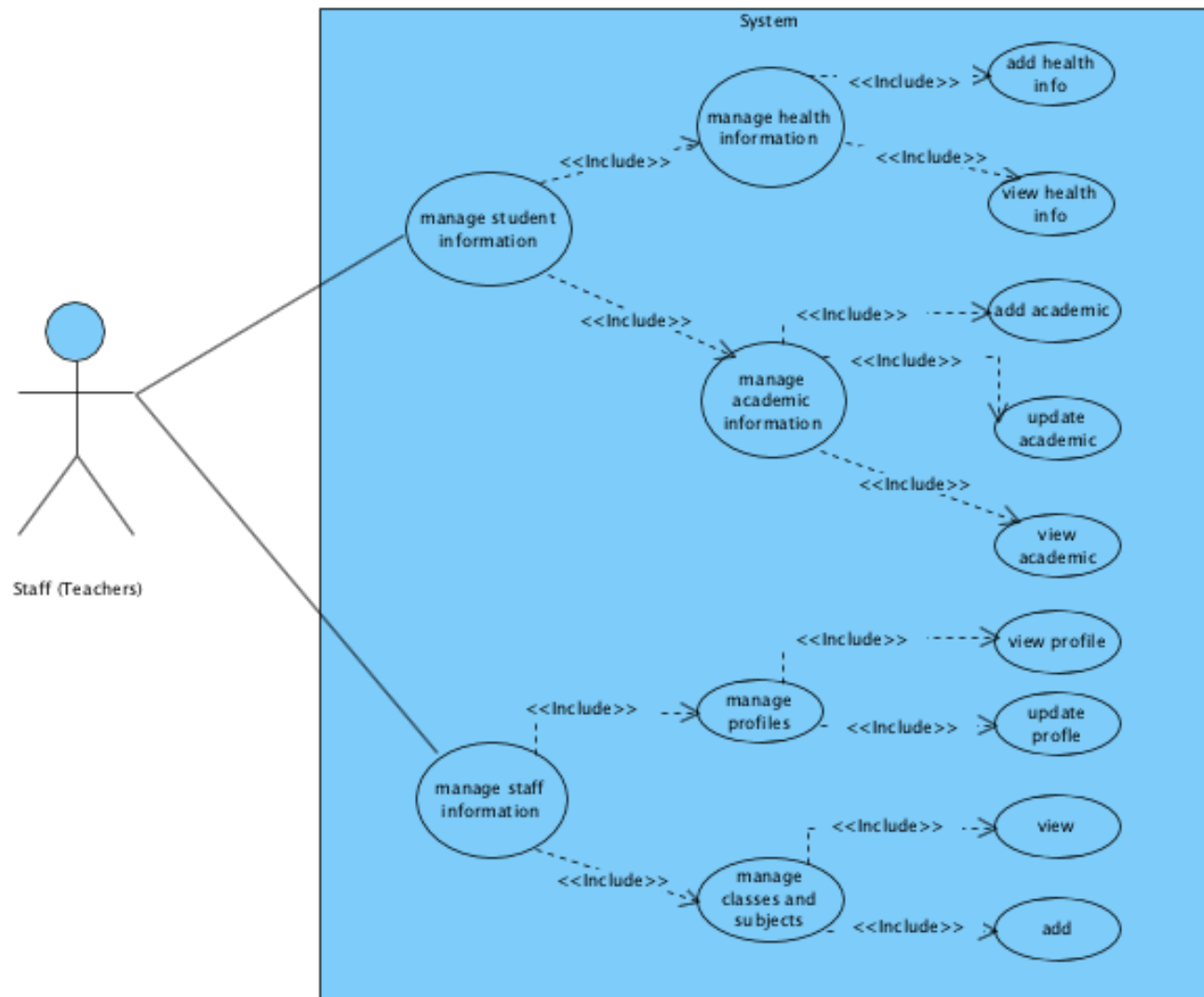
Appendix A: Structure of the System



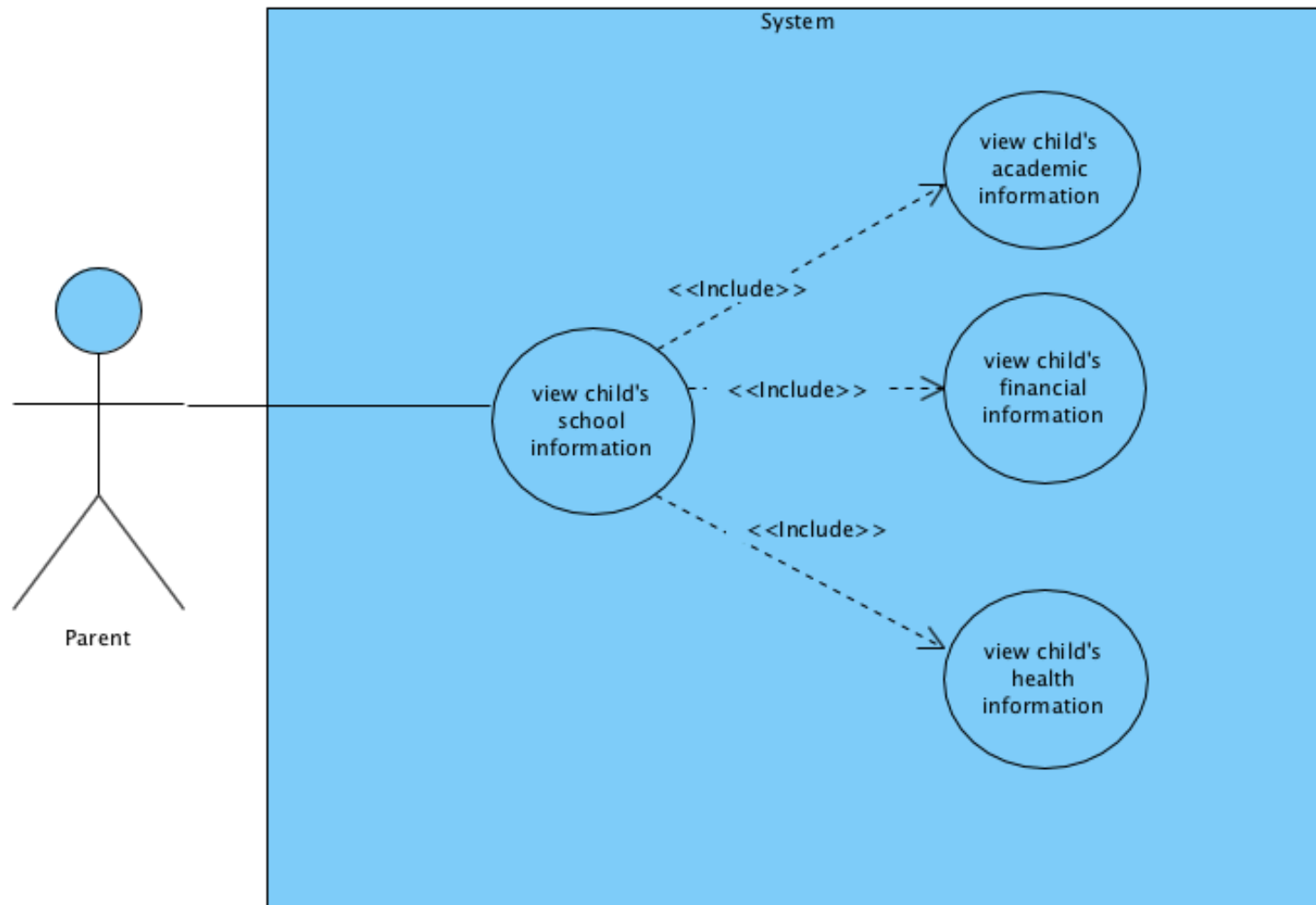
Appendix B: Use Case diagram for administrators



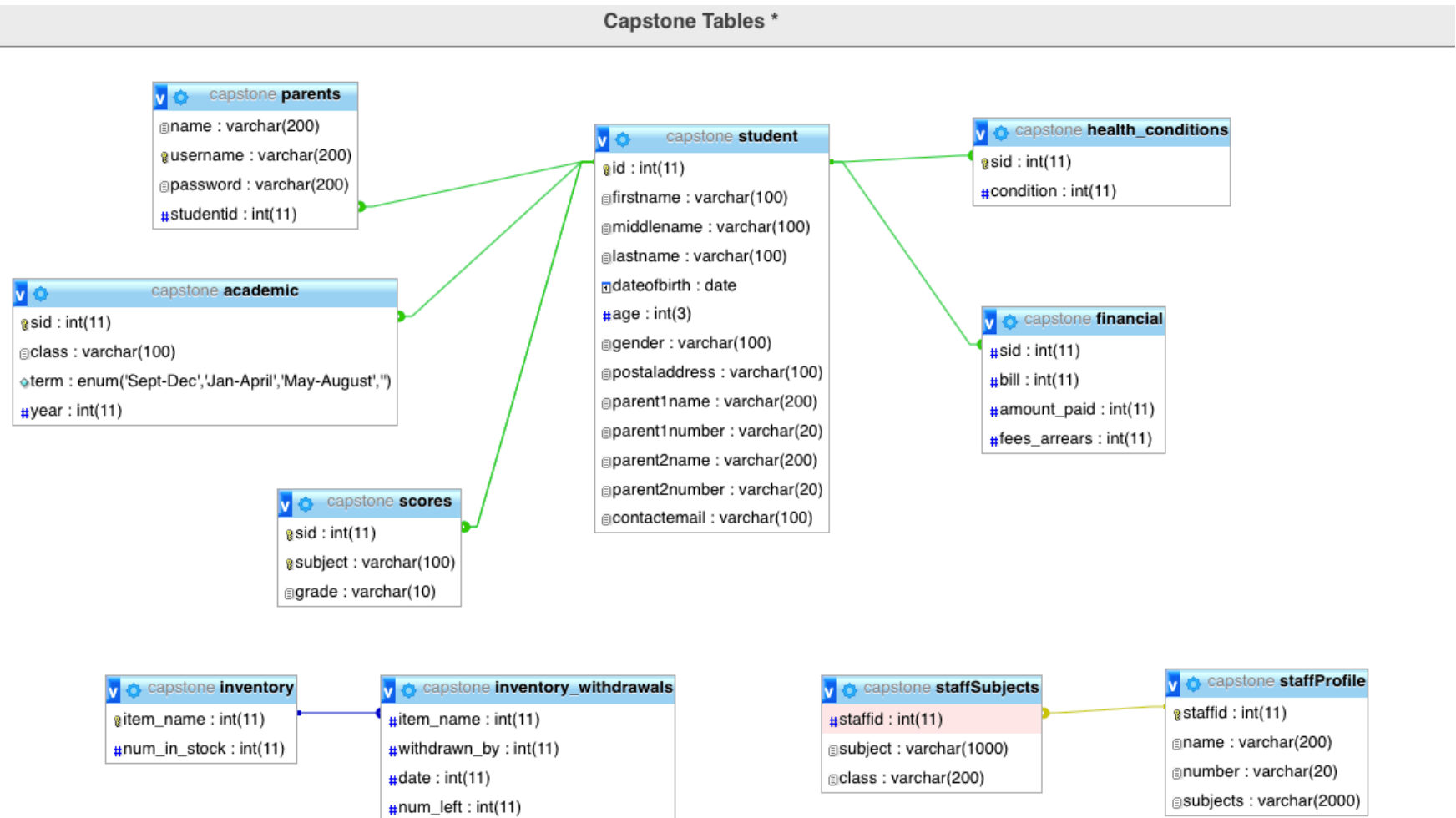
Appendix C: Use Case diagram for Staff (Teachers)



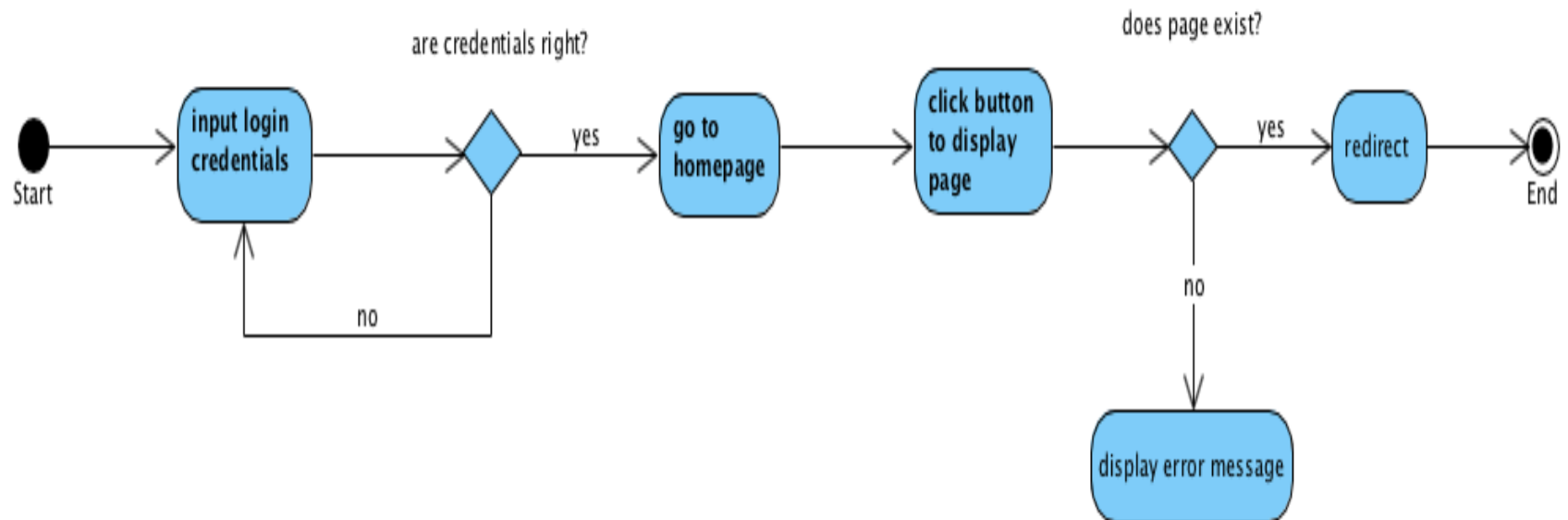
Appendix D: Use Cases for Parents



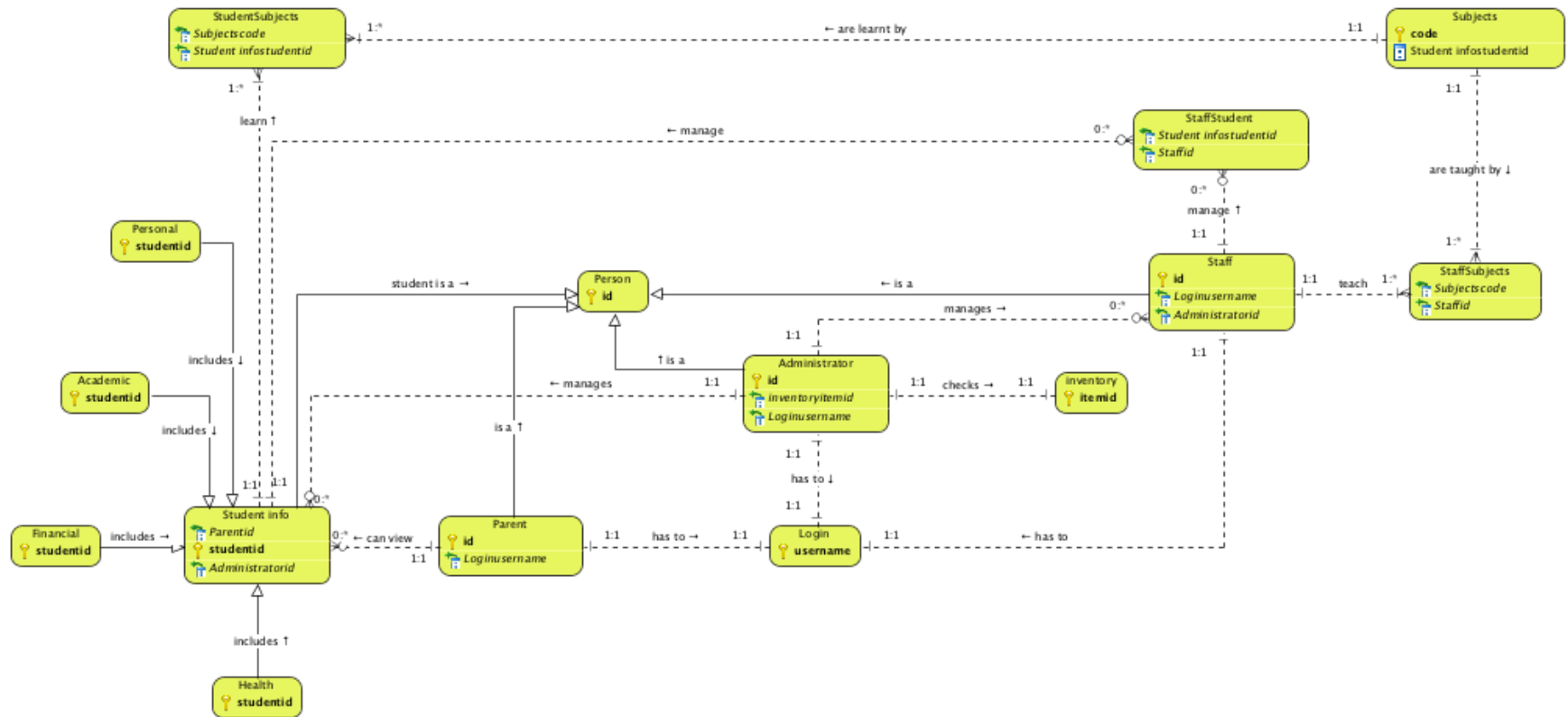
Appendix E: Database structure and table relations



Appendix F: Activity Diagram describing the general use of the system



Appendix G: Extended Entity - Relationship Diagram



Appendix H: Administrators' Questionnaire

For Administrators, head teachers and managers of basic schools ONLY

1. What kinds of records do you keep in the school? (example: inventory, student and staff information, etc.)

2. How do you keep these records?

- ☐ Paper – books, documents, files and folders
☐ Electronically via Excel
☐ Electronically via special software
☐ Other:

3. Are you satisfied with your current approach for storing records? Use a scale of **1** (totally unsatisfied) to **10** (totally satisfied)

1	2	3	4	5	6	7	8	9	10

- ☐ Other:

4. Would you like a new electronic method for storing this data?

- ☐ Yes
☐ No
☐ Other:

If yes, move to question 5. If no, thank you for your time.

5. What would you like to be able to do with such a system?

Appendix I: Teachers' Questionnaire

For Teachers in Primary Schools ONLY

1. Which section of basic school do you teach in?

- ☐ Pre-school
- ☐ Kindergarten
- ☐ Lower Primary (Grades 1 to 3)
- ☐ Upper Primary (Grades 4 to 6)
- ☐ Junior High School (JHS 1 to 3)

2. Do you keep records?

- ☐ Yes
- ☐ No

If Yes, move to question 3. If no, please move to question 7.

3. What kinds of records do you keep? (example: student personal information, grades, etc.)

4. What is your main mode of keeping these records?

- ☐ On paper or in a book
- ☐ Electronically via Excel
- ☐ Electronically via a specially made software
- ☐ Other:

5. Are you satisfied with your current approach for storing records? Use a scale of **1** (totally unsatisfied) to **10** (totally satisfied)

1	2	3	4	5	6	7	8	9	10

☐ Other:

6. Please explain your choice in question 5 above

7. Would you like to have a special software for keeping records?

☐ Yes

☐ No

☐ Other:

If yes, move to question 8. If no, thank you for your time.

8. What would you like to be able to do with such a system?

Appendix J: Parents' Questionnaire
For Parents of children in basic schools ONLY

1. Do you get any records from your ward's school?

- ☐ Yes
☐ No
☐ Other:

If yes, move to question 2, if no, move to question 6.

2. What kinds of records do you get? (Grades, Teacher's remarks)

3. In which form(s) do these records come?

- ☐ Paper - Documents, booklets
☐ Email
☐ SMS
☐ Other:

4. Are you satisfied with the way you currently get records from your ward's school? Use a scale of **1** (totally unsatisfied) to **10** (totally satisfied)

1	2	3	4	5	6	7	8	9	10

- ☐ Other:

If you are totally satisfied (i.e. option 10), move to question 7. If not, move to question 5

5. What do you not like about the mode of communication you chose in question 4 above?

6. Would you like a new way of receiving/ gaining access to records from your ward's school?

- ☐ Yes
☐ No
☐ Other:

If yes, move to question 7. If no, move to question 9

7. What kinds of records concerning your ward would you like to be able to access?

8. How would you want to be able to receive such information?

9. Any further comments?

Appendix K: Email Alerts on child registration and academic information update

Westlands Lyceum

Inbox - School - Ashesi 1:10 PM



Student Registration in Westlands Lyceum

To: Philip Wellington, Leticia Wellington

Dear Parent,

Your child Kelvin Wellington has been successfully enrolled in Westlands Lyceum.
Please take note of Kelvin Wellington's student ID number: **5653**
You will use the ID number to register into our system.

Regards,
School System Admin

Westlands Lyceum

Inbox - School - Ashesi 1:20 PM



Student Academic information update - Westlands Lyceum

To: Parent

Dear Parent,

The academic information for your child has been updated.

Please do well to check it out.

Regards,

School System Admin

Appendix L: Email Alert on staff registration

Westlands Lyceum

Staff Registration in Westlands Lyceum

To: Lisa Ama Sengretsi

Inbox - School - Ashesi 1:39 PM



Dear Lisa Ama Sengretsi ,

Your details have been registered into Westlands Lyceum's Teacher System.

Please take note of your username 'lisa_sengretsi'.

You must change your password before logging in.

Regards,

Westlands Lyceum

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